oil prospecting of the more precise methods of geological survey. Such work can be carried out only by competent persons qualified to undertake a survey for oil, and this implies training of a highly specialised character. Those who have had any experience, therefore, in this branch of teaching will readily appreciate the value of a book such as Mr. L. S. Panyity has written, a book which must also make a wide appeal to the student and to the oil geologist of the older school.

Considered purely from the academic point of view, the volume can unhesitatingly be put into a student's hands at the outset of his course without any apprehension as to its suitability as preface to both lecture and practical work. From the composition and origin of oil and gas, their migration and accumulation, through all the intricacies of modern methods of surveying and prospecting, to the sinking of wells and the production of crude oil, the author takes his reader through a thorough course of elementary instruction without burdening him with unnecessary technical detail. The early chapters deal with general geological definitions, conventions, and successions, considered from the point of view of oil technology. From these we pass directly to actual field-work, initiated by a lucid exposition of plane-table survey, including the more exact processes in triangulation. In the succeeding chapters, dealing with actual maps, it is pleasing to note that the construction and reading of isobath and isochore maps receive adequate attention, as both these phases of the subject present difficulties to the novice at first, though we should have preferred that the question of the interpretation of geologic structures had received fuller discussion, even to the exclusion (if necessary) of the long chapter on fossil flora and fauna. Condensed palæontology or palæobotany is seldom a success, and with the great number of useful text-books available for studying these subjects such an omission would need no apology.

The remaining pages of the volume are devoted more to the engineering aspects of oil prospecting, and include chapters on the location, sinking, spacing, and completion of wells, together with some notes on regulating the course of production of the crude oil derived. A somewhat lengthy appendix contains some useful tables of constants for triangulation work, and also for calculating the capacities of gas wells, etc.

As is usual with American publications of this nature, the book is profusely illustrated with maps and diagrams, and the inevitable "Landscape and Topographic Contour Map" (depicted on the inside cover of all the folios of the United States Geological Survey) finds a place here on p. 70. It is undoubtedly an attractive and useful publication, which, by virtue of its clearness of diction, careful arrangement of subject-matter, and freedom from "padding," should make an appeal to a very wide public.

H. B. MILNER.

The Induction Coil of To-day.

Induction Coil Design. By M. A. Codd. Pp. vi+239+14 plates. (London: E. and F. N. Spon, Ltd., 1920.) Price 21*s.* net.

IT is only within the last few years that the induction coil has emerged from the sanctum of the philosophical instrument maker and even approximated to an electrical engineering "job." It cannot yet be said to have shaken itself free of the trammels of empiricism, and it too often serves largely as a medium for the skill of the cabinet-maker and french polisher to impress a susceptible *clientèle.* Moreover, for X-ray work at any rate (and in particular for work with the Coolidge tube), the interrupterless transformer is finding fresh adherents each day, and it was high time that the case for the induction coil should be put by one who is conversant with coil construction and design.

Mr. Codd candidly concedes at the outset that precision measurements of coil phenomena are difficult, if not impossible, and as a consequence present-day design rests mainly on arbitrary standards which have been evolved empirically from practical experience. Holding the view that a knowledge of these standards should not be confined to the coil-maker, Mr. Codd has accordingly collected data from his experience of a number of typical and accepted designs, and set them out comparatively in the present book. To the coil-maker the wealth of practical and diagrammatic detail should be of value; and even the user, primarily concerned with performance, will be interested to learn of the constructional precautions and skill which have to be exercised, and of the relative common-sense values of the several designs on the market, for each of which extravagant claims of super-efficiency have usually been advanced by its author.

Here it may be remarked that the efficiency of even a large coil rarely reaches 50 per cent., and is usually nearer 30 per cent. Nor can the same coil be equally efficient for all purposes. It is in the success with which he reconciles antagonistic factors that the coil-maker's art finds its greatest expression. He knows, as a practical fact, that for a given transformation ratio the secondary winding should be such as to keep the self-induction as low as possible; he has found

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that for X-ray work the condenser capacity should be as small as is consistent with preventing undue sparking at the interrupter; and he has grown to realise that the design and performance of the interrupter are all-important and may enhance or undo his work on the coil.

There are certain other features which the coil-maker has learnt to incorporate in his design. He allows for each kilo-volt-ampere input about 15 lb. of iron core, of which he makes the length from six to ten times the diameter. He winds the primary so as almost to cover the whole length of the core, but he keeps the length of the secondary down to about three-quarters the length of the core, and finds that the diameter of the secondary should not exceed about 2·5 times its bore. Among many other guiding facts, he estimates to get about 4 kilo-volts from every 1000 turns in the secondary, knowing also that a transformation ratio in the region of 100 to 1 is a practicable figure.

All this and much besides is to be found in Mr. Codd's book. He supports many of his contentions with the help of a large number of oscillograph records. We regret to find no mention of Prof. Taylor Jones's work, but we gather that the book is limited to the author's own experience. There is a useful bibliography, but no index.

Our Bookshelf.

The Romance of the Microscope. By C. A. Ealand. Pp. 314. (London: Seeley, Service, and Co., Ltd., 1921.) Price 7*s.* 6*d.* net.

To the well-known "Library of Romance" Mr. C. A. Ealand contributes a volume on the microscope. He gives a glimpse of the early days of invention, of pioneer microscopists such as Leeuwenhoek and Hooke, and of the principles of the instrument. He then illustrates the use of the microscope in studying the life of ponds and streams (but why call the amœba "a free swimming denizen"?), the structure of plants, the structure of animals (in the course of this investigation, "Having taken our fill of the spiders' feet we may well turn our attention to their heads"), sections of rocks, impurities of food, bacteria, blood, rusts on leaves, small insects and parts of insects, and so on. We are sometimes forced to doubt the author's sincerity, as when he says that if we put the liver-fluke under the microscope "we can plainly see all its internal organs." That has not been our experience, nor anyone's. Similarly, we are not pleasantly impressed by being told that *Demodex folliculorum* (or, as the author has his specific names printed throughout, *Demodex Folliculorum*) is to be found in the sweat-glands. The book ends with more practical matters: the micro-telescope and super-microscope, chemistry and the microscope, the use of the microscope in manufacture, the camera and the microscope in alliance, the glass used in making lenses, and the choice and use of apparatus.

We think the book will help to diffuse an interest in microscopy, which, of course, means the discovery of a new world and of a new joy in life; but we wish the author had shown more microscopic precision in his workmanship. He tells us that, having found our sea-slug or sea-cucumber, especially the species called *Synapta Inhaerens,* we find by touch that its leathery skin is studded with some flinty matter, which we go on to verify under a low magnification. And so *passim.*

Organic Chemistry for Advanced Students. By Prof. Julius B. Cohen. Third edition. Part i., *Reactions.* Pp. viii + 366. Part ii., *Structure.* Pp. vii + 435. Part iii., *Synthesis.* Pp. vii + 378. (London: Edward Arnold, 1920.) Price 18*s.* net each volume.

THAT a reprint of the above work should be called for in just over a year after the publication of the last edition is clear evidence, if such were needed, of the value of the book; it may further be taken as welcome proof that there exists a large circle of serious students who are not content to acquire their knowledge in "tabloid form," but are prepared to work through a three-volume treatise on advanced organic chemistry. The book has an important mission to fulfil in imparting a sound knowledge of the principles underlying the modern developments of organic chemistry to the rising generation of chemists, and, from the rapid exhaustion of the last edition, one may conclude that it is successfully accomplishing this.

The present edition calls for little detailed comment, since no material changes have been made in the text, the author having confined himself to adding a number of references to recent literature, which will enable the student to bring his information up to date.

Leicestershire. By G. N. Pingriff. Pp. xii + 164. (Cambridge: At the University Press, 1920.) Price 4*s.* 6*d.* net.

AN interesting description of the many features of interest in Leicestershire is given in this book by pen and photograph. In the opening chapters the position, general features, rivers, and watersheds of the county are described. Its geology, natural history, and an account of its climatic conditions follow. Four chapters are then devoted to the people of Leicestershire and their industries, stress being laid on the increase of grassland as opposed to arable farming. The remainder of the book deals with the history and antiquities of the county, and the concluding chapter is a useful index to its chief towns and villages. Instructive diagrams, showing graphically the proportions of the acreage of the principal crops, form a brief appendix. The book is throughout well illustrated by interesting photographs and sketch-maps.

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